

DYNAMIC GENERATION OF A NETWORKED INFORMATION RESOURCE

5 This invention relates to a method of, and system for the, dynamic generation of a networked information resource. More particularly, but not exclusively the invention relates to a method of, and systems for the, dynamic generation of a personalised web-page.

10 Current systems for the generation of web-pages require the manual input of data/information in the form of hyper-text mark-up language (HTML). This has the disadvantage that it is not a real time representation of the information content of, for example, a list of people present in a meeting or information required during the meeting. Such information can be posted to a web-page prior to a meeting but any alterations to the information
15 content must be entered manually. Further to which people's responses, or contributions, to information posted on the web-page cannot be readily obtained on the web-page.

20 It can be seen therefore that current web-page generation systems do not allow for proactive, real-time updating of web-pages to maintain the information thereupon. This has the attendant problem that the information upon a web-page may be out of date when a user comes to access it or may not contain all of the information that is actually available within the network that hosts the web-page. This reduces the web-page's usefulness
25 to potential users.

It is an object of the present invention to provide a method of and systems for, the dynamic generation of a networked information resource that, at least partly, ameliorates one of the above mentioned
30 difficulties/disadvantages.

According to a first aspect of the present invention there is provided a method of generating a networked information resource comprising the steps of:

- 5 i) providing first and second network elements;
- ii) passing a first data set from the first network element to the second network element over a network via a wireless network connection;
- iii) passing a second data set from the second network element to the first network element over the network via a wireless network connection;
- 10 iv) collating the information passed between the first and second network elements to form the networked information resource.

In one arrangement steps ii), iii) and iv) may be enacted when the first and second network elements are within network connection range of each other. Most preferably steps ii), iii) and iv) may be enacted automatically when the first and second network elements are within network connection range of each other.

20 The method may include transmitting a network joining signal by either of the first or second network elements upon entering a network, the joining signal will typically include a network element identifier (ID).

The method may include transmitting an identifier by the other of the first or second network elements in response to receiving the joining signal from the either of the first or second network elements, typically the response includes an ID of the other of the first or second network elements.

30 The method may include receiving a response at the either of the first or second network elements from the other of the first and second network elements which identifies the other of the first and second network elements to the either of the first and second network elements.

Thus, the information available on the networked information resource is dynamic and updated as network elements enter and leave the network without the need for laborious manual entry of data.

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The method may further include the step of broadcasting, or multicasting, data by at least one network element in order to ascertain if there is a network element within connection range typically by requesting each network element receiving the broadcast data responds. The method may further include the step of allowing a network element to join the network and contribute information to the networked information resource as it moves into network connection range. The method may further include the step of removing information relating to a network element from the networked information resource upon said network element moving out of network connection range. The method may further include the step of prompting a user of a network element to store information relating to a network element which is moving out of connection range from the networked information resource or the storing of this information may be effected automatically.

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The information passed between the network elements and made available on the networked information resource may typically include electronic business card (V-cards), minutes of meetings, lists of attendees at meetings.

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For example, when a person carrying a personal digital assistant (PDA) enters a room which has a network arranged to provide a networked information resource according to the method of the present invention the PDA may automatically contribute the person's details such as their employer, business card and telephone number to the networked information resource. The networked information resource may contain the business cards of every person in the room and this may be stored on the PDA and used for future reference.

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The method may include providing the network in the form of short range wireless network. The network may be a Piconet. The method may include providing either or both of the wireless network connections in the form of an infrared connection or a radio frequency connection.

The method may include the step of providing a graphical user interface (GUI) upon at least one of the network elements. The GUI may be a browser. The method may include the step of storing a script for a web-page on at least one of the network elements, the web-page being the networked information resource. The at least one network element may be a server. The script may be written in any one of the following non-exhaustive list: HTML, XML or Java script. The method may further include the step of including the collated information upon the web page.

The method may include the step of accessing the web page via the GUI. The web-page may include the aggregate sum of the data passed between the first and second network elements. Thus, web-browsers can be used as a convenient and generic form of representing and sharing the information which is available on the networked information resource.

The method may include providing either, or both, of the first and second network elements in the form of a mobile telecommunications device. Either, or both, of the first and second network elements may be a personal digital assistant (PDA) or a mobile telephone.

The method may include providing at least one of first and second network elements having a long range, e.g. cellular, transceiver therein. The method may further include the step of accessing the networked information resource via a cellular transceiver associated with another network element. This allows devices that have left the short range

network to remain connected to and contribute information to the networked information resource.

The method may include the step of providing a third network element.

- 5 The third network element may be a transceiver. The method may include the step of mediating the passage of data between the first and second network elements through the third network element. The method may include the step of connecting the third network element to either both of the first and/or second network elements via a wireless connection. The
10 method may include accessing the networked information resource via the third network element which forms an access point, in use.

The method may include the step of providing a server. The method may include the step of providing the data on any one of the network elements.

- 15 The server may be hardwired to the third network element.

The method may include the steps of providing access control, for example an access filter. The method may further comprise the step of restricting the access to data stored on any one of the network elements by any other
20 of the network elements. The filter may allow selective access to some data stored on any one of the network elements by any other of the network elements.

The method may include the step of providing a beacon. The method may
25 include the step of broadcasting a network address associated with the information resource. The network address may be in the form of a URL. The method may further include the step of providing an access point, which may be a transceiver. The method may further include connecting the access point to a server which has the web-page associated with the
30 URL thereupon. The method may include the step of accessing the information resource via the access point by at least one of the network elements. One of the network elements may be the server. This provides

for large amounts of data to be readily accessible from a central server. The method may further include updating the data stored on the server. This may be carried out by a user of one of the network elements with appropriate access privileges.

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The method may include transmitting any one, or combination, of the following from the beacon: geographical location, purpose, v-card or an advert.

- 10 The method may include broadcasting the network address at a second location. The method may further include providing a second access point at the second location. The method may include the step of connecting the second access point to the network address. This allows for information to be shared between two remote groups who may require the same
- 15 information for example, when videoconferencing.

The method may further include the step of connecting at least one of the first and second network elements to a server. The connecting of the first and second network elements to the server may be via wireless network

20 connections.

- According to a second aspect of the present invention there is provided a networked information resource generation system comprising a network, a first network element, and a second network element, the first and second
- 25 network elements being connectable to the network via wireless network connections characterised in that at least the first network element has a broadcast means adapted to broadcast a signal, and at least the second network element has receiving means, adapted to receive the signal when the at least first network element is within wireless network connection
- 30 range, and interrogation means, adapted to request information from the at least first network element.

The at least first network element may, in use, provide information to the networked information resource via at least one of the wireless network connections. The information may be provided in response to the request from the at least second information resource, in use.

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The networked information resource may be a web page. At least one of the network elements may store a script for the web page. The at least one network element may be a server. The script may be written in any one of the following non-exhaustive list: HTML, XML or Java script.

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There may be a graphical user interface (GUI) upon at least one of the network elements. The GUI may be a browser. The web page may be displayed upon the GUI. Web-browsers can be used as a convenient and generic form of representing and sharing the information which is stored on each of the network elements.

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Either, or both, of the first and second network elements may be a mobile telecommunications device. Either, or both, of the first and second network elements may be a personal digital assistant (PDA) or a mobile telephone.

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The network may be a short-range wireless network. The network may be a Piconet. The wireless network connection may be an infrared connection or a radio frequency connection.

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At least one of first and second network elements may have a long range, e.g. cellular, transceiver therein.

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There may be a third network element. The third network element may be a transceiver. The third network element may mediate the passage of data between the first and second The third network element may be connected

to either or both of the first and/or second network elements via a wireless connection.

- Any one of the network elements may be the server. The server may be
5 hardwired to the third network element.

- There may be an access filter. The access filter may restrict access to data stored on any one of the network elements by any other of the network elements. The filter may allow selective access to some data stored on any
10 one of the network elements by any other of the network elements.

- There may be a beacon. The beacon may, in use, broadcast a network address associated with the networked information resource. The beacon may, in use, broadcast a network address associated with the web page.
15 There may be an access point, which may be a transceiver. The access point may be connected to a server. The server may, in use, store has the web page associated with the network address. The network address may be represented as a universal resource locator (URL).
- 20 The web page may be accessed by at least one of the network elements via the access point, in use. One of the network elements may be the server. This provides for large amounts of data to be readily accessible from a central server. The data stored on the server may be updated as a network element enters or leaves the network, in use. A user of one of the network
25 elements with appropriate access privileges may update the web page, in use.

- In use, the network address may be broadcast at two discrete locations. There may be a second access point at the second location. The second
30 access point may be connected to the networked information resource. There may be a second beacon at the second location. This allows for

information to be shared between two remote groups who may require the same information for example, when videoconferencing.

5 According to another aspect the invention comprises software encoded on a data carrier which when loaded into a processor of a network element and run on the network element causes the device to be a network element in accordance with any preceding aspect of the invention, or causes the device to take part in, or perform, any method aspect of the invention previously recited.

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According to yet another aspect the invention comprises a network element programmed with the software of the preceding aspect of the present invention.

15 According to still another aspect the invention comprises software encoded on a data carrier which when operational on a server causes the server to be a server in accordance with any preceding server aspect of the present invention, or to perform, or take part in, a method, according to any preceding aspect of the invention.

20 The invention will now be described, by way of example only, with reference to the accompanying drawings in which:

25 **Figure 1** is a schematic representation of a first embodiment of a networked information resource generation system according to at least one aspect of the present invention;

Figure 2 is a schematic representation of a second embodiment of a networked information resource generation system according to at least one aspect of the present invention;

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Figure 3 is a schematic representation of a third embodiment of a networked information resource generation system according to at least one aspect of the present invention;

5 **Figure 4** is a schematic representation of a modification of the system of Figure 3;

10 **Figure 5** is a schematic representation of a further modification of the system of Figure 3;

15 **Figure 6** is a representation of a room booking list generated by the system of Figure 3; and

20 **Figure 7** is a schematic representation of a yet further modification of the system of Figure 3.

Figure 1 shows a wireless network 10, typically a piconet, comprising a transceiver 12 and mobile devices 14a-e.

25 Each of the mobile devices 14a-e has a transceiver 16, a storage device 18 and a screen 20. The mobile devices 14a-e are typically personal digital assistants (PDA) and will be referred to as PDA's hereinafter, but could be mobile telephones, laptop computers or any other suitable portable device. The transceiver 16 is typically an infra-red or a radio transceiver or
30 alternatively it could be any suitable radiative transceiver.

The transceiver 16 intermittently transmits an identification signal. Upon receipt of the identification signal the transceiver 12 sends a signal requesting data to the PDA 14a-d via the transceiver 16.

35 Data stored on the storage device 18 of one of the mobile devices 14a is transmitted to the transceiver 12 via the mobile devices transceiver 16. The

transceiver 12 broadcasts the data within the network 10. Each of the mobile devices 14a-d within the network 10 receives the data via their respective transceivers 16.

- 5 Each of the PDA's 14a-d runs software 19 that provides a graphical user interface (GUI) 20 on the respective screens 21. The GUI 20 is used to display the information.

- Each of the PDA's 14a-d pushes information 10 the transceiver 12 over the
10 network 10. The transceiver 12 does not contain a large amount of memory, it only has a buffer memory to store data which is in transit over the network 10.

- The information on each of the PDA's 14a-d exists locally in their
15 memories and/or storage devices 16. However, what is displayed on each of the PDA's 14a-d is an aggregate of the sum of the information. The information is typically booking schedules for meeting rooms, minutes of meetings, e-business cards, suggestions of topics of discussion in a meeting etc., but could relate to facilities available for meetings such as rooms,
20 projection facilities. Generation of such an aggregate page is not a complex operation – one logical approach would be for each PDA to hold a template for the “aggregate page” with the different elements of the template completed by data received from other PDAs, but other approaches are entirely possible. It should also be noted that while such an
25 arrangement is particularly appropriate to business meeting information, this is far from the only application for aspects of the invention (which need not be limited to business meetings, meetings as such, or specific locations).

- 30 The PDA 14e is shown outside the network 10. It is envisaged that a device such as this PDA 14e will be able to contribute data to the aggregated information by the use of a cellular telephone type transceiver

22 in the PDA 14e to connect the network 10 via a cellular transceiver 23 associated with the network transceiver 12.

5 Upon entering the network 10 the PDA 14e starts communicating with the transceiver 12 and contributes its data to the aggregate data over the network 10. This is because the short range, for example Piconet, data transfer protocols such as Bluetooth and IEEE 802.11 are far more efficient and have higher data transfer rates than current cellular data transfer protocols.

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When one of the PDA's, for example PDA 14e having entered the network 10, leaves the network 10 it is possible to still display the information associated with the PDA 14e if the PDA 14e maintains a long distance cellular telephonic link to the network 10 via the transceiver 23.

15 Alternatively, one of the other PDA's, for example PDA 14b, may store the information from PDA 14e and retransmit it over the network 10.

There may be privileges, access controls, associated with the data which restrict who can access the data. For example, the owner of PDA 14c wishes to deny access to their data to the owner of PDA 14b so configures their access controls to prevent the PDA 14b from accessing the data. This is shown in Figure 1 by the lack of information on the screen 20 of PDA 14b relating to the secretary of the meeting. Alternatively, there could be time restrictions placed upon the access of documents such that documents
25 could only be accessed for a limited period of time, for example for the expected duration of a meeting. This could require the chair of a meeting to have to access alter the privileges if the meeting were to overrun.

In an alternative embodiment, shown in Figure 2, the PDA's 14a-d
30 communicate directly between themselves via their respective transceivers 16 to form a Piconet which is dynamic as the PDA's 14a-d move into and out of communication range of each other.

The transceiver 16, for example of PDA 14a, intermittently transmits an identification signal. Upon receipt of the identification signal the PDA 14b sends a signal requesting data to the PDA 14a. The PDA's 14a-d push
5 information between each other and the current aggregate information is displayed on the screen of each PDA 14a-e.

In a modification to either of the above embodiments a prompt 26 to save information appears on the screen 20 of the PDA 14a-e. This prompt may
10 appear either when a PDA enters the network or when a PDA leaves the network. Alternatively, the prompt may appear at regular time intervals.

In a modification to the either of the abovementioned embodiment the PDA's 14a-d within the Piconet interrogate each other to ascertain which of
15 them, if any, have sufficient available memory to act as a server and store the aggregated information thereupon.

In a yet further embodiment of the present invention, shown in Figure 3, a network 50 comprises a plurality of PDA's 52a-d substantially similar to
20 those of the first embodiment, an access point 54, a beacon 56 and a server 58.

Each of the PDA's 52a-d has a short range transceiver 60 mounted therein. The transceiver 60 is typically an infra-red transceiver, a radio frequency
25 transceiver or any suitable type of radiative transceiver.

The transceiver 60 intermittently transmits an identification signal. Upon receipt of the identification signal the access point 54 sends a signal requesting data to the PDA 52a-d via the transceiver 16. The data is
30 received by the access pint 54 and placed on the server 58.

The access point 54 and the server 58 are connected to each other. The access point 54 has a short range, typically of the order of 10m, transceiver 61 that allows access to data stored on the server 58 to be accessed via a wireless network such as, for example, a Piconet.

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The beacon 56 is typically mounted on a wall 63 or a door frame 64 of a room 66 and emits a short range, typically of the order of a few tens of metres, omnidirectional signal 68. The signal 68 carries a repeating broadcast of a universal resource locator (URL) 70 corresponding to a web page 71 which is with an event happening in the location or the location itself. The hypertext mark up language (HTML) script associated with web page 71 is stored on the server 58. The script associated with the web page 71 need not be in the form of HTML but may be Java, XML or any other suitable language.

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The PDA 52a has an application 72 running thereupon that, upon receiving the signal 68, automatically opens a generic browser 74 and loads the URL 70 into the application 72. The PDA 52b has an application 76 running thereupon that, upon receiving the signal 68, produces a prompt 78 informing the user of the existence of the URL 70 and asks the user if they wish to open the URL 70 within the browser 74. If user indicates, either by a keystroke or any other positive confirmation, that they wish to open the web-page associated with the URL 70 the application opens the web page associated with the URL. The PDA 52c has an application 80 running thereupon that, upon receiving the signal 68, produces a prompt 82 that informs the user of the existence of the URL 70. The user of the PDA 52c must open the browser 74 and enter the URL 70 into the browser 74 themselves in order to access the web page 71. The PDA 52d does not inform the user that the signal 68 has been received and the user must obtain knowledge of the URL 70 from another source, for example, another user in the room or from minutes of the meeting.

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In a modification of the previous embodiment attendees of meetings in the room 66 can 'sign in' upon entering the room. The PDA's 52a-d may automatically send a signal 84 containing the attendees personal details when the signal 68 is received. The attendees personal details typically include name, employer, position in the meeting. The server 58 then adds this name to the list of attendees in real time. As a person leaves the meeting their PDA can sign them out of the meeting again in a dynamic, real time manner.

In another modification to the previous embodiment the chair of the meeting, for example the user of PDA 52a has access privileges to allow them to access the HTML script and change the information contained on the web page 71. This allows the chair of a meeting to maintain up to date information relating to the ongoing meeting. Other attendees of the meeting may, or may not, be allowed to access the web page 71 and alter the contents of the web page 71.

The web page 71 may also include a booking list that gives details of who has booked the room 66 for meetings, who is expected to be attending the meetings. The beacon 56 may, in some embodiments, as shown in Figure 4 broadcast multiple URLs 70a-d relating to multiple meetings that are due to take place in the room 66. The PDA's 52a-d can be configured to only display those URLs which relate to meetings that their users are expected to attend.

In a further modification of the previous embodiment there is dialogue between the server 58 and the PDA's 52a-d that details which documents on the web page 71 that are required for the meeting that is scheduled to take place in the room 66 at any given time. This dialogue results in the automatic maintenance of the web page with the correct documents for any given meeting.

The web page 71 associated with the URL 70 typically contains building infrastructure information associated with the room 66 such as the location of amenities, for example toilets, beverage facilities, fire fighting equipment and presentation/projection equipment provided. In particular, as shown in Figure 5, portable amenities 90 such as projectors 90a, a television 90b, a computer 90c, or a printer 90d may have respective short-range transceivers 92a-d therein. The transceivers 92 a-d are linked to the server 58 via a wireless connection to the access point 54. If one of these portable amenities 90 is removed from the room 66 the link between the access point 54 and the transceiver 92 a-d will be broken and the server's 58 list of available amenities will be updated to reflect this and the web page 71 for altered accordingly, in real time.

The information as to who is present in a meeting, the available amenities in a meeting room, the booking schedule and the agenda of meetings may be presented on a display 93 on a screen 94 outside a meeting room 66, as shown in Figure 6.

This display 93 has a first portion 95 which relates to the amenities present in the room 66 and a second portion 96 which gives details of the booking schedule and agenda of meetings. The first portion 95 will not alterable be users, for example, the chair of the meeting, whereas the second portion 96 will be user alterable to reflect changes in booking schedules and agenda of meetings.

Figure 7 shows, a further modification to the present embodiment wherein a second room 97 is provided with an access point 98 and a beacon 100. The access point 98 is connected to the server 58 so as to share information dynamically between the occupants of the two rooms 66,97.

The connection between the access point 98 and the server 58 may be a Piconet bridge, a LAN, a WAN, the Internet, a public switched telephone

network (PSTN) or a cellular telephone link. This arrangement allows the sharing of information between rooms 66,97 which are geographically close, for example in the same building over a LAN, or geographically distant, for example on a different continent over the PSTN.

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There is typically a two way transfer of information and documents between the PDA's and the server with the PDA's uploading documents to the server and the server downloading documents to the PDA's.

10 It will further be appreciated that the wireless network arrangements in any of the embodiments described hereinbefore may utilise either of the Bluetooth or IEE 802.11 data transfer protocols or any other suitable data transfer protocol.

15 The wireless network may be a Piconet or a wireless LAN network there may be additional functionality provided by provision of cellular communication between the wireless network elements.

It will be appreciated that any of the modifications to any of the embodiments are mutually exchangeable between embodiments, where

20 applicable.